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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,582	05/09/2001	Jithamithra Sarathy	312/12	5064
27538	7590	06/15/2005	EXAMINER	
KAPLAN & GILMAN, L.L.P. 900 ROUTE 9 NORTH WOODBIDGE, NJ 07095			NGUYEN, JOSEPH H	
			ART UNIT	PAPER NUMBER
			2815	
DATE MAILED: 06/15/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	09/852,582	SARATHY ET AL.	
	Examiner	Art Unit	
	Joseph Nguyen	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 18-29 and 31-35 is/are pending in the application.
- 4a) Of the above claim(s) 14, 15 and 20-28 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-13, 29, 33 and 35 is/are allowed.
- 6) ☒ Claim(s) 1-4, 16, 18, 19, 31 and 34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 18 is objected to because of the following informalities: claim 18 depends from canceled claim 17. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 31 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsui (JP Patent 363111679A).

Regarding claim 1, Matsui discloses on figure 3 (also see English Abstract) a semiconductor device comprising a wave guide core 13 for passing light there through; a grating 14 with an effective index for reflecting one or more wavelengths of said light; an absorption section 16 for absorbing said reflected wavelengths and generating a photocurrent from said absorbed wavelengths; and a tuning section 18 for changing said effective index of said grating so that only a particular wavelength is selected to be reflected by said grating and therefore absorbed by said absorption section.

Note that the limitation "for changing said effective index of said grating so that only a particular wavelength is selected to be reflected by said grating and therefore

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absorbed by said absorption section" is merely functional language. The tuning section, which constitutes a similar structure as that of the claimed tuning section, is capable of performing as claimed.

Regarding claim 31, Matsui discloses on figure 3 said tuning region 18 comprises an electrode 18c, and said effective index is changed by changing an electrical current injected into said electrode.

Regarding claim 34, Matsui discloses on figure 3 said absorption section 16 comprises an electrode 18b for generating said photocurrent from said absorbed wavelengths.

Note that the limitation "for generating said photocurrent from said absorbed wavelengths" is merely functional language. Matsui teaches a part of light 20 propagated through the optical waveguide layer 13 is reflected by the grating 14, absorbed in the absorption layer 16 and taken outside as an electric current. Therefore, electrode 18b is capable of performing as claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Chinen (US 5,281,829).

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Regarding claim 2, Matsui discloses on figure 3 substantially all the structure set forth in the claimed invention except the semiconductor device being integrated into a single optical circuit on a common substrate. However, Chinen discloses in col. 3, lines 26-35 the semiconductor device (photodetector) being integrated into a single optical circuit on a common substrate (col. 2, lines 38-41). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Matsui by having the semiconductor device being integrated into a single optical circuit on a common substrate for the purpose of obtaining the optical semiconductor device with a low cost since they are formed on a same substrate (col. 2, lines 23-25, Chinen).

Claims 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui.

Regarding claim 3, Matsui discloses on figure 3 substantially all the structure set forth in the claimed invention except the device area being less than or equal to 5000 square micrometers. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Matsui by having the device area being less than or equal to 5000 square micrometers, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 4, Matsui discloses on figure 3 substantially all the structure set forth in the claimed invention except the device length and width dimensions being less

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than or equal to 500 μm along one dimension, and less than or equal to 100 μm along the other. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Matsui by having the device length and width dimensions being less than or equal to 500 μm along one dimension, and less than or equal to 100 μm along the other, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui in view of Danielson.

Regarding claim 16, Matsui discloses on figure 3 the photodetector as set forth in the claimed invention. Danielson discloses on figure 5 a system comprising a photodetector 36 (col.5, lines 33-34); a trans-impedance amplifier 40 (col. 5, line 41); an analog to digital converter 48 (col. 5, line 59); and a microprocessor 98 col. 11, line 61). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the photodetector as disclosed by Matsui into the system disclosed by Danielson on figure 3 for the purpose of providing a sensing instruments which are applicable to a broad range time relay, phase shift and exponential decay measurements (col. 3, lines 43-46, Danielson).

Regarding claims 18 and 19, it would have been obvious to one of ordinary skill in the art to integrate photodetector, trans-impedance amplifier, analog to digital

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converter on a common substrate to obtain an optical semiconductor device with a low cost since they are formed on a same substrate.

Allowable Subject Matter

Claims 5-13, 29, 33 and 35 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The reference (s) of record do not teach or suggest, either singularly or in combination at least the limitation of "an undoped region, laterally disposed above the substrate; a waveguide laterally disposed above the undoped region for passing light therethrough; a grating with an effective index positioned between the substrate and the undoped region for reflecting one or more wavelengths of said light; an upper region, of a second doping type, laterally disposed above the waveguide region; an absorption section positioned above said upper region for absorbing said reflected wavelengths and generating a photocurrent from said absorbed wavelengths" for claim 5.

Response to Arguments

Applicant's arguments filed 11/04/2002 have been fully considered but they are not persuasive.

With respect to claim 1, applicant argues Matsui does not disclose any tuning means to change the effective index of any of the gratings. However, the limitation "for changing the effective index of the grating" is merely functional language. Element 18 of Matsui can function as tuning section to change the effective index if the grating by

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injecting electric current through electrode 18c. Note that Matsui does not teach against injecting electric current through electrodes 18c. In other word, element 18 is capable of performing as claimed. Therefore, it is not structurally distinguishable between Matsui and the claimed invention herein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN
June 8, 2005


TOM THOMAS
SUPERVISORY PATENT EXAMINER